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Canada ~~Advisory~~ Committee on
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ADVISORY COMMITTEE
ON
RECONSTRUCTION

[Reports of Subcommittees]

II. CONSERVATION AND DEVELOPMENT
OF NATURAL RESOURCES

Final Report of the Subcommittee

September 24, 1943



OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1944

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(ADVISORY COMMITTEE)

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(RECONSTRUCTION)

[Reports of Subcommittees.]

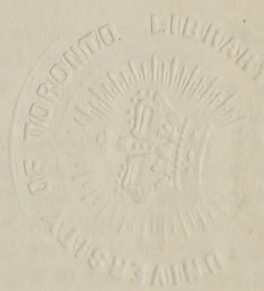
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The reports of the Advisory Committee on Reconstruction consists of a Committee Report and reports by Subcommittees under the following titles:—

- I. Agricultural Policy.
- II. Conservation and Development of Natural Resources.
- III. Publicly Financed Construction Projects.
- IV. Housing and Community Planning.
- V. Post-war Employment Opportunities.
- VI. Post-war Problems of Women.



II. SUBCOMMITTEE ON CONSERVATION AND DEVELOPMENT OF NATURAL RESOURCES

FINAL REPORT

Terms of Reference

To consider and recommend to the Committee on Reconstruction, the policy and program appropriate to the most effective conservation and maximum future development of the natural resources of the Dominion of Canada, having regard to the importance of these resources as national assets and emphasizing the part which the proposed policies may play in promoting employment opportunities at the end of the present war.

Membership

Dr. R. C. Wallace (Chairman); D. Roy Cameron, E. J. Carlyle, Dr. J. B. Challies, Dr. John D. Detwiler*, D. A. Gillies, Dr. A. G. Huntsman, Vernon E. Johnson, Hoyes Lloyd*, John McLeish, Professor Esdras Minville, Dr. J. J. O'Neill, Greig B. Smith*, Robert J. C. Stead*. Dr. L. C. Marsh (Research Adviser), J. E. Mackay (Secretary).

Work of the Subcommittee

1. A final report of this Subcommittee, in six related sections, is appended.
2. An extensive series of special memoranda have been prepared by and for the use of the members of this Subcommittee. A list of these is appended.

INTRODUCTION

(a) The Subcommittee has studied the natural resources of Canada exclusive of the soil, namely minerals, forests, water and power, fisheries and wild life, and tourist amenities, from the standpoint of (a) the providing of employment following the cessation of hostilities, (b) the long-term policies necessary to safeguard these resources for the use of the people of Canada. The recommendations which are submitted herewith deal with these two aspects of the post-war problem separately, and with particular reference to the individual resources treated independently. The recommendations are such as can be implemented in the main within the existing machinery, and can be put into effect without delay. If they are to be of value in coping with the employment situation at the close of the war, it is necessary that immediate consideration be given to them by the federal and provincial authorities. The initial steps should be taken before the war is over, in order that returned men, and men released from war industry, should fit in to a place already prepared and in operation. The Subcommittee urges that adequate preparations be now made by the responsible authorities.

(b) Early in the course of its studies, the Subcommittee found that, while it is necessary to consider the resources separately, wise policies can be elaborated only in the light of the joint contribution that these resources can make to balanced living in stable communities. The development of a single resource has led too frequently to the disruption of the community when the resource was exhausted. This has been the case particularly with minerals, but

*Invited to join the Subcommittee in addition to original members.

it has occurred as well in the exploitation of forest and fish resources. The farmer and the fisherman can be assisted by participating in the scientific utilization of a forest area close at hand. The use of the soil and the forest may help a mining community to survive the exhaustion of the mine. Thought must be given to maintaining and enriching community life in areas where the resources, taken together, can make a special contribution to the economic life of the people of that region. With this end in view a preliminary survey has been made of the Ganaraska watershed in southern Ontario in order to determine the techniques that should be employed.

The Subcommittee is of the opinion, and has already recommended in an earlier memorandum, that regional committees, representative of expert knowledge in the utilization of the various resources, and including responsible government officials, should be formed in order that consideration be given to the combined contribution that our resources can make to the development of each particular region in question, and should report to the National Development Board.* Through this procedure federal and provincial authorities would have the benefit of the advice of those who have an intimate knowledge of the natural wealth of the many and diverse areas of our country, including the Northwest Territories, and are in a position to recommend the procedure to be adopted to make the best use of this wealth for the present and for future generations.

(c) Unless adequate precautions be now taken, much of our natural wealth will rapidly disappear. It is not too late to establish policies which will protect and maintain our renewable resources for all time. The Subcommittee considers that the immediate protection of such resources is of first importance, and advises that the employment of specially trained returned men and men from war industries to carry out these policies is a matter of urgent consideration when hostilities cease. The Subcommittee feels that the people of Canada are concerned about the conservation of our resources and will support measures directed to that end. In the recommendations under the individual resources specific proposals are made which have to do with the management of our renewable natural wealth to the end that it may be continuously available to succeeding generations of Canadians.

(d) One of the most important social services which can be provided to the rural and farming communities of Canada is the extension of electrical power facilities to the rural town and to the farm. This is more than an industrial development. It is a social need. It will do more than any other single factor, except equitable prices for farm products, to stabilize farm life in Canada. As a social service, it may require the assistance of public funds in order that rural customers may enjoy low-cost electrical services. The extension of electricity to the farm will provide a demand for inexpensive electrical equipment and machinery, which will mean much for many industries in the transformation from war to peace.

(e) The Subcommittee is impressed with the need of survey data, and with the fundamental importance of research. Provincial authorities are hampered in their planning by an inadequate knowledge of their natural resources. Surveys, aerial, topographical, geological, forest, wild-life, fisheries, soil, are of first importance. Much larger staffs than have hitherto been available are needed for this work if developmental projects are to be wisely planned. What can be done now, before the war is over, should be done, in order that future developments may be based on adequate knowledge. In the wider and more varied use of our resources, research will play a fundamental part. This has been abundantly demonstrated in the carrying on of the war. It will be no less valuable in the building up of a stable peacetime economy. Our research organizations, federal, provincial, industrial, and university should receive more generous support and encouragement. They are vital to a program of full employment.

*Advisory Committee on Reconstruction Report, Ottawa 1944. p. 28.

(f) Men must be trained for the place that they are to take in the work of conserving and developing our resources. This applies to prospecting, forest management, logging operations, fisheries, care of wild life, topographical and geological surveying, and the wider fields of research connected with our natural resources. The number of men with adequate training available at the end of the war will be totally insufficient to meet the needs. It is necessary that the machinery be now set up for the training of suitable men as they are released from the armed forces and from war industry. This responsibility will devolve on the Department of Labour, in association with other departments of government, federal and provincial, with the universities, and with the industries that are based on our natural resources. The Subcommittee wishes to emphasize the necessity of training, before the war is over, a corps of men who can be used as instructors and supervisors in the general post-war training and employment program.

(g) The Subcommittee does not consider it advisable to recommend the procedure as to how the costs of carrying out the policies which it presents are to be shared between the federal and provincial authorities. In provincial territory, except in the national parks, and other relatively small areas, the resources are under provincial administration. The federal authorities have a direct interest both in their productivity and in their conservation. It would seem to the Subcommittee that the method of sharing costs in each individual enterprise can only be arrived at by consultation between the federal government and the provincial government or governments directly concerned. It is imperative that an early decision be reached in this matter, so that plans may go forward without delay.

In general terms, research, surveys and long-term conservation policies may be considered to be more directly the responsibility of the federal authorities, on whom as well the training and employment of returned men is a particular charge.

General Recommendations

To summarize, the Subcommittee submits the following general recommendations:—

1. In order that employment in the utilization and conservation of our natural resources be available when hostilities cease, the recommendations presented in this report should be given immediate consideration, to the end that steps be now taken to put them into effect.

2. To effect the balanced development and sound utilization of our resources regional committees should be established, the personnel of which would be representative of all the resources in consideration, these committees to advise the National Development Board. In an earlier memorandum this recommendation was presented in detail.

3. Conservational measures must be put into effect without delay to protect our renewable resources from further impairment. Several of the recommendations in this report have this end in view. In the long-term interest, it will be profitable to provide employment generously after the war to accomplish this purpose.

4. The providing of electrical power to farms and rural towns must be dealt with as a fundamental social service for the stabilizing of rural life, and may need to be assisted from public funds in order to place the service and the equipment within the reach of the rural customer.

5. The need for surveys, aerial, topographical, geological, forest, wild-life, fisheries, soil is urgent, if post-war plans are to be based on adequate data. The urge for this work is immediate and as much as possible should be done before

hostilities cease. The value of research in developing more economical extraction of, and wider uses for, our natural products is of so great importance that generous assistance and encouragement should be given to all research directed to post-war needs.

6. A training program for the men who will be needed in the development and in the conservation of our resources should be set up without delay. While a large number of untrained men can be used, the effectiveness of their work will be dependent on the availability of a corps of instructors and supervisors, which must be trained before general demobilization begins.

7. An early decision should be reached as to the sharing of costs as between federal and provincial authorities in implementing the policies herein recommended, or such as may be adopted. This can only be done by conference between the authorities concerned. The longer-term programs of conservation, of research, and of surveys may be considered to be properly the responsibility of the Federal Government.

1. FORESTS AND FOREST INDUSTRIES

(a) From the standpoint of national wealth production and the maintenance of many communities, the development of permanent and prosperous forest industries is of the first importance. Forests are a renewable asset. Unfortunately, they are also destructible.

(b) The primary forestry resource is the forest soil. Repeated forest fires may destroy its productive capacity.

(c) Fifty-eight per cent of the land area in the nine provinces is forested land. The optimum development of a Canadian economy means intelligent use and management of our forest estate.

(d) In 1941 forest industries employed almost a quarter of a million persons, supporting indirectly well over half a million of our population. The net value of products was approximately \$537,000,000, and external trade provided a credit balance of over \$350,000,000.

(e) Forest industries export the bulk of their production. Before the war Canada's principal competitors in the United Kingdom, the world's greatest import market, were the Scandinavian countries. Russia was also entering the picture as a serious competitor. Scandinavian countries have the geographic advantage of a shorter haul. Russia had the competitive advantages of production by the state and sale of products without regard to profit and loss.

(f) Immediately after the war we may expect an accelerated export demand until European timber-producing countries get back into production. As the latter occurs markets will probably become increasingly competitive. Northern European countries, with economies based primarily on wood-product exports, are likely to force prices downwards. Russia, with enormous timber reserves, may decide to use them as an essential factor in her export trade.

(g) The continued prosperity of forest industries is essential to Canada's well-being. Dominion and provincial governments must share in the task of securing and holding adequate markets.

(h) The intrinsic qualities of Canadian woods are as high as those growing elsewhere but Canadian costs of production must be kept to a minimum and the quality of the marketed product must be improved.

(i) Canadian forest industries operate under the handicap of single-product operation. Reorganization of manufacturing practices to utilize all the raw materials available in the forest, giving multiple-commodity production and reduction of waste, as is done in Europe, will be necessary.

(j) Good business management must be based on balance sheets. We need to know what our forest resources are, how fast they are growing, and at what rate they are being depleted through use or wastage from all causes. To be of practical use forestry balance sheets must be compiled for each forest region. Regions should be selected on the basis of geography, climate, resources, industrial development, population characteristics and aptitudes, and administrative requirements.

(k) Management plans must provide for forest industry requirements, present or potential; employment for local population; recreation; watershed protection values, and where important, wild life conservation needs.

(l) Over 275 million acres of forest lands are classified as accessible productive forest. Annual growth is estimated to yield about 14 cubic feet per acre. This was enough to meet all pre-war use and depletion, but it is probable that war demands are eating into forest capital.

(m) Scandinavian countries, with forest lands not potentially superior to Canadian, obtain by scientific treatment a yield of around 28 cubic feet per acre annually. Experimental work has demonstrated that this annual volume production per acre may be readily surpassed in many parts of Canada by simple cultural treatments (silviculture).

(n) Any form of silviculture will mean increased costs over present extraction methods. Present handicaps to adoption of improved forestry practices are:—

- i. Capital losses through uncontrolled forest fires, insects, or disease. These losses cannot be covered by insurance.
- ii. Insecurity of tenure of forest holdings.
- iii. Lack of any guarantees as to future tax burdens.
- iv. Uncertainty as to future markets.
- v. Ignorance of, or inattention to, the use value of wood material now left in the woods or wasted during manufacturing processes.
- vi. Instability and inefficiency of labour due to seasonal nature of operations and competition of higher paid employment in other industries.
- vii. Failure of governments to realize the necessity of providing, at the public expense, means of transportation for the extraction of forest products, as is done for agriculture and mining.
- viii. Inadequacy of holdings to produce raw material requirements on a sustained yield basis (for some units of industry).
- ix. Necessity of liquidating excess holdings of mature timber (for some units of industry only).
- x. On the British Columbia Coast, mechanized operations in virgin stands of age-classes unreplicable under management, and under conditions where even utilization of existing smaller-sized material is considered uneconomic.
- xi. In the lumber industry (except on the British Columbia Coast), the trend to semi-portable or portable mill operations with no continuing interest in any particular forest property. The result is often heavy cutting in immature stands just reaching maximum volume and value growth.

(o) The most serious obstacle to the introduction of planned management for forest holdings is the forest fire problem. Management can only become economically feasible when forest protection reaches the stage that forests can be considered as insurable assets. The depression period saw retrogression in fire protection efficiency and the advent of war conditions has prevented any sensible improvement. Most provinces are financially incapable of providing adequate protection. The Dominion Government has a strong, if indirect, interest in forest resources and should give real and continuing assistance to provincial efforts.

(p) Serious losses have occurred through insect attacks and fungous diseases (e.g., spruce sawfly, bronze birch borer, and white pine blister rust). The scientific investigations and devising of emergency remedial measures require a highly trained technical staff that only the Dominion can provide.

(q) Sound management of forest lands must be based on accurate and adequate data of the rates and conditions of growth of trees and timber stands and the best means of producing the greatest quantity of material of the highest quality in the shortest time and at the lowest cost. Such information is obtainable only through planned silvicultural research, organized on a continuing basis. Because of the long-time element this is necessarily a function of government. Forest regions and the problems they present transcend provincial boundaries. To prevent duplication of effort and to secure uniformity, it is proper that the Dominion should have assumed the main responsibility in this field. Unfortunately, the support given to silvicultural research to date has been far short of the need.

(r) The situation with respect to research in forest products presents many parallels to the situation described above (para. q). The products of Canadian forest industries compete in world markets with those of countries which maintain extensive research facilities. The Dominion Government established forest products laboratories in 1913, but their usefulness has been much restricted by insufficiency of funds and staff limitations. Financial assistance and participation in control of them by organized forest industry should produce the most effective results.

✓ (s) In many parts of the country forest devastation, improper settlement, or poor agricultural practice have produced blow sand or other barren areas which pay no taxes and threaten adjoining fertile lands. Replanting of such areas is an urgent public necessity.

(t) Farm woodlots, while comprising only about one-tenth of the accessible productive area, produce in volume about one-third of the country's wood supplies. At present their productive value is seriously impeded by carelessness or ignorance of simple cultural requirements.

(u) The tourist trade will become one of Canada's outstanding sources of wealth after the war. Forests play a primary part in tourist attraction. Likewise the preservation of wild life for tourist purposes, for fur production, or for native population support, demands consideration from the forestry angle.

(v) Canada has the world's highest per capita water-power development and great possibilities of further expansion exist. Forests play an essential role in streamflow regulation, erosion prevention and water-table conservation. For these reasons also every Canadian has a direct interest in preservation of the forest resource through proper management.

(w) The average Canadian has no firm understanding of his personal interest in the country's forest estate. One of the most important tasks awaiting immediate action is the development of a program of sustained public education to make the people of Canada forest conscious. The obvious and best place to start this work is in the schools.

Recommendations

In the light of the above, and to ensure that the forest resources and forest industries may be utilized to the greatest possible extent in supporting the Canadian economy after the war, the following recommendations are made:—

A. Preparatory Measures

1. The National Development Board and regional advisory committees previously recommended by the Committee on Reconstruction, should be established forthwith.

2. Provincial forestry plans should be assembled and submitted for review by advisory committees. Plans concurred in by the National Development Board should be recommended to the Dominion Government. These should be segregated into transition period and long-term projects. The former should be concentrated mainly on provision of better fire protection and more adequate transportation facilities from woods to mill. As soon as approved by government they should be developed in complete detail for immediate execution at the appropriate time. Excepting for operations on lands of the Dominion, forestry projects should be covered by specific agreements between the Dominion and the province concerned. Responsibility for actual conduct of work should lie with the province, or with a unit of industry designated by such province, and Dominion participation restricted to provision of funds as agreed upon and inspection of operations to ensure compliance with terms of agreements.

3. A Forest Resources Rehabilitation Act should be passed at the next session of Parliament for the purpose of providing for the training of some 15,000 men for each of the next five years and containing, inter alia, the following provisions:—

- (a) Authorization to the Minister of Mines and Resources, with the approval of the Governor General in Council, to enter into agreements with other government departments, provinces, or industries for the prosecution of forestry works or activities.
- (b) Authorization for the undertaking of forestry projects on lands held in the right of the Dominion, or Indian lands.
- (c) Arrangements for the pre-training of staff to carry out forestry operations.
- (d) Establishment of apprenticeship schemes whereby returned soldiers, munitions workers, or unemployed youths may be employed in forest industry or woods operations, paid by industry on the basis of their production or use value, supplemented from Dominion Government funds to the extent required to provide them with total earnings sufficient to ensure a reasonable standard of living during their apprenticeship.
- (e) Establishment of scholarships for undergraduate and post-graduate studies in forestry, forest entomology, forest pathology, wood utilization, or specialized fields thereof.
- (f) Setting up of short training courses in woodlot management.
- (g) Authorization to the Minister of Finance to advance to the Minister of Mines and Resources, out of the Consolidated Revenue Fund of Canada, such sums of money as are required to effectuate the purposes of this Act, provided that the total advances to March 31, 1949, shall not exceed one hundred million dollars.

4. A Dominion Forest Act should be passed at the next session of Parliament to provide a legislative basis for:—

- (a) The operation of forest experiment stations and forest products laboratories.
- (b) The administration of national forests.
- (c) Agreement with provinces, universities, or industry for the prosecution of forest economics investigations, silvicultural research, forest protection research, the operation of demonstration forests, and forestry education.
- (d) The acceptance of grants or donations of money, lands, forests, or goods to be used for forestry purposes.

- (e) The appointment of honorary forest officers to give voluntary assistance in the protection of lands of the dominion.
- (f) The granting of financial assistance to the provinces for forest protection, insect and disease control or eradication, development of recreational facilities, woodlot improvement projects, reforestation, forestry publicity and education, and subsidies to be passed on to industry for approved forestry practices in woodlands management.
- (g) Contribution by the Dominion of one-half the cost of purchase of private lands by provinces, where the Dominion is satisfied that such lands should, in the public interest, be maintained by the provinces for forest purposes.

5. The Dominion Forest Service should be established as a separate technical branch of the Department of Mines and Resources, thereby assigning to forestry that standing in the dominion government administration which its importance warrants, and placing forestry on a basis equivalent to mining.

6. The Dominion Forest Service should be provided with funds and trained staff adequate to undertake the Dominion Government's proper obligations in the forestry field.

B. *Immediate Post-war Measures*

7. Accelerated demobilization from the armed forces of forestry-trained personnel.

8. Prompt inauguration, as employment needs may demand, of forestry projects approved under Dominion-provincial agreements.

9. Institution of apprenticeship schemes by the Dominion Department of Labour in co-operation with forest industries.

10. Re-establishment, in co-operation with the Department of Labour, of the National Forestry Program for youths coming of employment age.

11. Undertaking by the Dominion, either through the R.C.A.F. or commercial aviation, of a comprehensive program of aerial photography; details as to areas to be covered, scale of photographs, etc., to be worked out in co-operation with the provinces and interested industry.

12. Expansion of Dominion Government map production facilities to enable prompt publication of base maps for forest areas not now suitably mapped.

13. Development by the Dominion Forest Service of training facilities for interpretation of aerial photographs to facilitate completion of forest inventories.

14. Resumption by the Dominion Forest Service of rate-of-growth surveys on a basis to be determined by conference with provinces and universities.

15. Expanded program of soil surveys by the Dominion Department of Agriculture in co-operation with the provinces, with special attention to marginal and sub-marginal lands.

16. Appraisal by provinces of waste lands to determine justification and priority for reforestation in the light of potential timber production, soil conservation, watershed or wild-life protection, recreational or other use.

17. Immediate increase in capacity of provincial forest tree nurseries and acceleration of planting programs by provincial and municipal authorities as stock becomes available. (Two to three years are required to produce planting stock.)

18. Allocation by the Dominion Government of R.C.A.F. facilities to undertake fire detection patrols, and transportation of fire fighters and equipment where requested by provincial authorities.

19. Provision for the use in forestry projects of available tractors, trucks, and other surplus army or air force equipment specially suitable for forestry operations.

20. Resumption by the Dominion Government of administrative control and management of the eastern slopes of the Rocky Mountains and the creation of national forests thereon, in order to provide effective protection for the headwaters of the great rivers of the plains.

21. The convening by the Prime Minister of Canada of a National Forestry Congress to reach a basis for appropriate action with respect to:—

- (a) The setting up of forest protection standards and financial arrangements necessary to achieve them, including protection in organized municipalities.
- (b) Market extension requirements.
- (c) Continuity of tenure of forest holdings.
- (d) Reduction of anomalies as between provinces in forest holdings charges, stumpage rates, employees' accident insurance costs, etc.
- (e) Development of a satisfactory program of future taxation of forest lands for the purpose of promoting sustained yield operations.
- (f) Marketing facilities, tax concessions or subsidies required to reorganize forest industries on a multiple-product basis, to provide for efficient use of all raw materials in forest holdings.
- (g) Forestry and forest products research requirements in Canada and the provision of facilities therefor.
- (h) Proper land use, including forest colonies, forest holdings, degree of state control of cutting on private lands required in the public interest, encouragement of better farm woodlot management, segregation by statutory authority of forested Crown lands useful chiefly for forest purposes, establishment of municipal and provincial forest reserves.
- (i) The measures necessary to complete a region-by-region stock-taking of the forest resource and to keep it up to date by periodic revisions.
- (j) The use of the forest resource for recreation, wild-life conservation and watershed protection, and their correlation with industrial requirements.
- (k) The better education of the general public on the importance of forests and forest industries in the economic life of Canada, and the interest and responsibility of each individual citizen with respect thereto.
- (l) The possible establishment of a National Forest Policy Committee, of which the Minister of Mines and Resources of Canada might appropriately be chairman, and the Ministers of the provincial departments administering forestry affairs, members, to determine policies and to initiate action to implement proposals mutually agreed upon as in the public interest of Canada.

C. Long-Term Measures

22. With Dominion assistance, development of forest protection to a degree that forests may become a commercially insurable risk.

23. Selection by provincial authorities of units of the forest industry (or sites for the establishment of such units), which should be considered in the light of a planned natural resources development as essential industries, provided that such industries under a 99-year renewable lease may be required to develop manufacturing processes to use all raw materials available in forest holdings.

24. Based on adequate forest inventory data, allocation to such essential industries under a 99-year renewable lease of a contiguous forest area of suf-

1 sufficient size to provide a continuous flow of raw materials, such area to be retained by the industry under agreed financial terms and conditions so long as operated under proper forestry principles mutually agreed upon.

25. The balance of the forest estate to be set aside in provincial or municipal forests and managed for sustained yield by adequate staffs of trained foresters. Only timber designated for removal should be cut and it should be disposed of under short-term sales with rigorous enforcement of silvicultural clauses embodied in cutting contracts.

26. Provincial legislation to be passed, requiring management of private forest lands conforming to standards in effect on publicly-owned areas.

27. Each province to maintain an accurate inventory of its forest resources compiled on a regional basis and periodically revised by growth and depletion data. The Dominion Forest Service should be provided with these inventories and should maintain an over-all Canadian forest balance sheet.

28. Maintenance by the Dominion Government of extensive and up-to-date research facilities in the Dominion Forest Service in the fields of silviculture, wood utilization, forest protection, and forest economics.

29. Employment by provinces of extension foresters to advise and assist municipalities, woodlot and other forest owners in proper management of their holdings.

30. Establishment by the forest industry of a centralized Forest Products Institute to correlate all interests and speak for the industry as a whole in all matters respecting general welfare. The Institute as one of its functions might well maintain a statistical service charting current stock positions, movements and prices of forest products in Canadian and foreign markets.

31. Expansion by the Dominion and provincial governments of trade promotion work in the domestic and foreign marketing of forest products, including subsidies to forest industry bureaux organized for that purpose.

32. Adequate Dominion assistance to the provinces for forest purposes to be authorized under the Dominion Forest Act, proposed in paragraph 4 above.

2. MINERAL RESOURCES

Recommendations in respect to mineral resources for:—

A. The provision of immediate post-war employment.

B. A long-term, or continuous policy, to assist in their discovery, development and use on the basis of sound conservation.

(a) Mineral resources are a wasting asset. When used they can only be replaced by new discoveries.

A committee set up by the Canadian Institute of Mining and Metallurgy upon consultation with the Dominion Bureau of Statistics has learned that:—

63 per cent of Canada's metal production in 1942 came from mining areas discovered prior to 1910;

11 per cent from mining areas discovered between 1910 and 1920;

21 per cent from mining areas discovered between 1920 and 1930;

5 per cent from mining areas discovered since 1930.

(b) Consequently, continued, intensified search for, and discovery of, new sources of supply is indispensable if the Canadian mineral industry is to survive.

(c) Scientific research has contributed in great measure toward improving the efficiency of mining methods and the recovery of metals and minerals and is constantly developing new uses for mine products.

(d) By 1938 the number of persons directly employed by the industry has reached a total exceeding 107,000, directly or indirectly supporting, it is estimated, about 1,200,000 people or one-tenth of our population.

The value of metals and minerals produced in that year exceeded \$440,600,000. (Production in 1942 reached a value of \$564 millions). On the other hand, Canada imported in the fiscal year of 1938 mine and mineral products and manufactures thereof approximating a value of \$390,000,000. Canada is a heavy importer of petroleum, coal and iron, and these alone accounted for \$310,000,000. Canada produces an exportable surplus of 26 items on the mineral list, but is dependent to a greater or less extent on imports of 16 items. In addition there are six items in our import list of which Canada has as yet no production.

(e) A great majority of metal mines operating at the beginning of the war had been discovered more than 20 years previously. Successful prospecting had almost come to an end by 1940.

(f) To meet war needs, the Government has been forced to undertake extensive prospecting for strategic materials as well as actual mine operations, activities formerly left to private initiative. Our mineral resources are being drawn upon to the limit of available manpower and equipment. Resources of metals are being so rapidly depleted that a serious falling-off of production under post-war conditions is threatened, unless immediate action is taken to stimulate private development.

(g) Ores of metals vary greatly in the percentage of metal contained and in the percentage recovered. The lower the cost of recovery the greater will be the tonnage of ore available for treatment. Taxation charged as a cost against mining reduces the amount of metal that can profitably be recovered from a given mine. The higher the tax, the greater the loss of metal that might otherwise have been recovered.

(h) There is a wide field for extending employment provided new sources of mineral wealth are found and new methods of utilizing those rocks and minerals, which occur in great abundance, are developed.

The essential requirements are intensive stimulation of prospecting, the provision of maps—topographical and geological, the provision of transportation facilities (roads, etc.) into mining areas, a minimum of restrictive measures so that the prospector may continue to be stimulated by the possibility of a find that will compensate him for years of disappointment.

Recommendations

In view of the above facts, supported by the numerous briefs and memoranda submitted to the committee, the following recommendations are made:—

A. For the Provision of Immediate Post-war Employment

1. That provision be made, preferably in co-operation with the provinces and universities, for the training of thousands of prospectors.
2. That adjustments be made in respect to taxation that would stimulate prospecting and mine development and mineral recovery.
3. That extensive aerial surveying be undertaken to provide bases for topographic and geologic mapping so that the entire area be photographed in the least possible time.

Such aerial survey work will also contribute directly toward the acquisition of essential information respecting forests, wild life, agriculture, water supply, road, rail, and pipe-line, and power-line construction, etc.

4. That contributions be made in co-operation with the provinces toward the provision or improvement of transportation facilities whether by road, trail, water, rail or air into mining areas.

5. That the provinces be invited to confer with the appropriate Dominion authority in a review of "Blue Sky Laws" with particular reference to their effect on prospecting and mine development.

6. That a body or commission, on which the mining industry should be adequately represented, be set up to investigate the general effect of high taxation on mines and more particularly the possible permanent loss of resources which might otherwise be recovered.

B. Long-Term Policy

Recommendations for action by the dominion government and wherever possible in co-operation with the provinces:—

7. A continuation of policies that will contribute toward the stimulation of prospecting, such as the education of the prospector by means of annual series of lectures; making mineral collections available; and supplying him with topographical and geological maps.

8. The development of scientific prospecting, including research on geo-physical means of locating minerals in co-operation with applied geological knowledge. This research might properly be undertaken by the National Research Council in co-operation with the Geological Survey.

9. A long-term, definitely planned, annually increasing, program of topographical, aerial and ground surveys and mapping.

10. A similar long-term, definitely planned, annually increasing, program of geological surveying and mapping with all the necessarily associated activities, as now carried on by the Geological Survey.

11. A systematic program of drilling in specially selected drift-covered areas in order to determine geological structure as a contribution toward prospecting for mineralized bodies in these areas.

12. The continuation and extension of the activities and facilities of the various testing and research laboratories dealing with mining, ore treatment, and metallurgical problems, fuel research, industrial minerals research, and related work that will contribute toward greater efficiency in recovery, improved products and the development of new uses for minerals and metals.

13. Systematic field study of operations in mining camps and of the problems experienced in the recovery, treatment and utilization of the ores, minerals and products derived therefrom, so that these problems may be made the subject of laboratory testing and research.

14. The investigation by mineral technologists and engineers of the possibilities of industrial development based on mineral and power resources as an amplification of the present policy of investigations and reports on mineral resources.

15. Continued and more detailed study of the varying physico-chemical character of water resources across Canada as a service for manufacturing industries generally, and as a service for biological research.

16. A systematic study of underground water supply based on geological studies and drilling.

17. The establishment by the Dominion Government, through highly qualified specialists, of consulting advisory assistance in respect to, and the co-ordination of, problems, dealing with safety in mines with particular reference to mine gases, mine fires and explosions, bumps, rock bursts, etc.

18. That the organization of the Dominion Department of Mines and Resources include two or more deputy ministers; that at least one of these deputy ministers devote his whole time to the branches of the department dealing directly with the conservation and development of natural resources; that the said deputy minister be always chosen on account of his proficiency in technology pertaining to the scientific conservation and development of natural resources, as well as for administrative ability.

19. That arrangements be made between the Dominion and the provinces for annual or otherwise regular conferences of deputy ministers or their representatives having to do with the administration of natural resources.

20. In addition to the suggestions herein offered, post-war problems in an expanding mining industry will be of particular national importance and should be carefully studied. Such problems would include those relating to:—

- (a) International trade in raw materials and in finished products.
- (b) Development of industries based wholly or in part on imported raw materials and those based on domestic raw materials.
- (c) The extent to which industries can be profitably developed in Canada on the basis of such resources as iron ore, aluminum and other metals.
- (d) The whole question of the proper utilization of our coals for fuel, power, by-products, basis of chemical industries, nucleus of manufacturing developments, etc., to obtain maximum utilization, and to eliminate bonuses and subventions.
- (e) The proper rate of opening up new, relatively inaccessible country to the development of mining and other natural resources and the inter-relationship of such developments so that a community may be maintained after the mines have become exhausted and thus avoid rehabilitation problems.
- (f) The whole question of taxes, on the one hand, and bonuses and other assistance including ultimate rehabilitation, on the other, seems to be entirely anomalous and should be thoroughly explored on the basis of ultimate national benefit and economy.

3. WATER AND POWER RESOURCES

Recommendations in respect to water and power resources for:—

A. The provision of immediate post-war employment.

B. A long-term, or continuous policy, to assist in the use and control of water on the basis of sound conservation.

(a) *Water* is vital to human existence. Adequate supplies are necessary for human and animal consumption, for plant growth, for industrial purposes, for the irrigation of lands in arid or semi-arid regions, for the provision of navigation facilities, and for the development of power. Water, in excess, may be destructive of life and property. The use and control of water, therefore, is a matter of national importance.

(b) *Surface and underground water*, although an ever renewed resource, is subject in its renewal to climatic vagaries from day to day, from season to season, and from year to year. The importance of surface water is obvious. Underground water has an equally important, but not so well recognized, role in supplying domestic, farm, forest and industrial needs. Systematic and continuous records of surface and underground water supplies are necessary for its effective use and control.

(c) *Water power* is an instrument for the development of other natural resources and for providing the amenities of human existence. Low-cost water-

power resources favourably distributed throughout most of the Dominion are a priceless asset in Canadian economy. More than 98 per cent of the electrical energy generated in Canada is from water-power developments. At the end of 1943 the total water-power installation in Canada will be approximately 10,000,000 horse-power or about 20 per cent of the total resources of the country, which are estimated to be capable of supporting an installed capacity of more than 51,000,000 horse-power. The greater part of the reserve of undeveloped water-power resources is to be found on rivers at present remote from centres of population and industry but there are substantial sources of power still undeveloped within feasible transmission distance of existing markets.

(d) From the beginning of the war until the end of 1943 new water-power installations will have been made to the extent of almost 1,800,000 horse-power. In the same period a substantial part of the country's pre-war power-generating facilities have been employed in supplying the demands of war industry. With the cessation of hostilities, therefore, there may be a power surplus of from 2,000,000 to 3,000,000 horse-power, most of which will be in the central provinces of Ontario and Quebec. The utilization of this surplus power is intimately associated with the plans and policies that may be devised for the return of pre-war industries to a peacetime basis, for the utilization of newly established wartime industries wherever possible in peacetime production, and for the extension of the use of electrical energy by the people of Canada, particularly in rural areas. The same plans and policies will influence the future development of new sources of hydro power.

(e) *Floods*—Canada, fortunately, is free of devastating floods such as occur on the great river systems of the United States, China, and other countries. Damaging floods, however, affect various parts of the country periodically and property losses from such floods could be prevented or mitigated by the construction of flood-control works in many localities.

(f) *Drought*—In the Great Plains region of Western Canada and in central British Columbia many areas have insufficient precipitation for the successful pursuit of agriculture. Irrigation in these areas is necessary and the conservation, control, and distribution of both surface and underground water supplies is of vital importance. The use of the rivers of the Great Plains region in Canada raises both interprovincial and international problems. For the most equitable and advantageous use of these waters, therefore, co-ordination of control is essential and planned utilization should be undertaken on a watershed basis.

(g) *Navigation*—The great waterways of Canada now play and will continue to play a great part in the communication systems of the country. Works for the control and improvement of these waterways may be required, among them the improvement of the Great Lakes-St. Lawrence System.

(h) *Water pollution, domestic water supply and sewage disposal*—Works for domestic water supply and sewage disposal have been retarded by the war in many municipalities throughout the Dominion. A planned program of such works, for post-war construction is essential in the interests of public health and should provide substantial opportunities for employment in many municipalities.

Recommendations

In accordance with the foregoing facts, supported by information secured at conferences in the various provinces, the following recommendations are made:—

A. *For the Provision of Immediate Post-war Employment*

1. That plans and policies for the use of wartime industrial establishments in post-war production and for the attraction of new industries be energetically investigated and pursued with a view to utilizing the strategic asset of a large surplus of low-cost hydro power in the post-war period.

2. That a systematic review be undertaken immediately by an appropriate federal agency, in consultation with the provinces but on a national basis, of all methods of financing rural electrical service, including low rates of interest, subsidization of rural installations, and reduction in the cost of appliances, with a view to determining the most satisfactory form of public assistance.

3. That all research organizations, federal, provincial and industrial, be urged to continue and expand investigations into new uses and applications of power, including cheaper electrical appliances for home and farm use.

4. That schemes be developed for the construction of flood control and flood prevention works on rivers and streams where damaging floods occur, with suitable provision being made for an equitable division of cost as between the Dominion, the province, and the municipality concerned.

5. That water storage and irrigation projects in the drought area of the Great Plains region in Canada be proceeded with in accordance with plans already made by the Prairie Farm Rehabilitation Administration for the post-war period with particular stress being given to the project on the St. Mary and Milk rivers which is designed to use fully Canada's share of these international waters.

6. That construction of the remaining links in the Great Lakes-St. Lawrence Waterway be carefully studied as possible segments of a comprehensive program of public investment designed to maintain full employment.

7. That measures for the improvement of domestic water supply and sewage disposal systems be given special consideration in any post-war public works program.

8. That surface water supply investigations conducted by the Dominion Water and Power Bureau in collaboration with provincial authorities be extended so as to provide adequate data for the design and operation of water resource works embraced in post-war development programs.

9. That systematic investigations of ground water supplies be inaugurated by the Dominion Water and Power Bureau and the Geological Survey in areas where such supplies are of economic importance.

10. That extensive aerial surveying be undertaken as soon as possible in inadequately mapped areas to supply basic topographic information for the appraisal of water resources.

B. *Long-Term Policy*

11. The continuation and systematic extension of basic water resources investigations by the Dominion Water and Power Bureau in collaboration with the provinces with a view to having as complete basic information as possible for the planning of water resource undertakings in all parts of Canada.

12. A long-term program of topographical, aerial and ground surveys and mapping.

13. Continuous research into new uses for power with a view to the systematic development and use of Canada's reserves of undeveloped water power.

14. Systematic planning of policies to foster the extension of industries and the location of new industries based on the advantage of low-cost power, including consideration of the establishment of industries in rural and small urban communities.

15. The setting up of a Western Provinces Water Board to include representatives of the Dominion and the provinces of Alberta, Saskatchewan, and Manitoba for the purpose of advising the respective governments on the most equitable and advantageous use of the limited water supplies in the Great Plains region in Canada.

16. Systematic studies by the Dominion and the provinces in their respective fields of all water resources problems on a watershed basis with a view to developing policies for the most advantageous control and use of water in such watersheds for power, flood control, navigation, log-driving, irrigation, domestic and industrial water supply, wild life and other uses.

4. FISHERIES AND WILD LIFE

The subject in general presents a host of problems that have been little explored, but that are similar to those that have become familiar to man in his attempts to domesticate animals and plants. Life is intricately related to air, land and water and cannot be dealt with effectively without taking account of the extremely varied and varying characteristics of these parts of its environment.

FISHERIES

Aquatic life, irrespective of its plant or animal nature and of the degree to which it has come under man's control, i.e. has become domesticated, is included under the heading "Fisheries".

Owing to the nature of the climate of our northern coast, our sea fisheries, commercially the more valuable, are virtually limited to the Atlantic and Pacific coasts. They extend out from shore an indefinite distance into the ocean in international waters, being limited only by the extent of profitable operation, and by agreements with other countries that attempt to fish the same waters. Our inland fisheries are in the very extensive lakes and streams throughout the country that are maintained by drainage of water from the land.

There are largely unknown and probably very great possibilities of increasing the yield of our fisheries in all our waters. Contrary to much opinion on the subject, evidence is against our northern waters ever being made to give anything like the yield from waters that are now very productive. To realize the possibilities of increasing the yield it is necessary to know (1) what undeveloped resources there are, where, when and how they can best be taken, and how they can best be used to our advantage, (2) what proportion of stocks is necessary for reproduction (most species have very high reproductive power) and how the surplus can be most easily taken, and (3) what measures of increasing these stocks are economically feasible.

Recommendations

A. *Short-Term Projects*

1. It is recommended that, owing to their importance for the use of aquatic resources, support be given to proposals for the following:—

- (a) Intensive aerial surveys to show contours and water courses.
- (b) Intensive hydrographic surveys of the more accessible open waters by means of the echometer (sonic depth-finder).
- (c) Betterment of transportation facilities for reaching all parts of important river systems.

Realization of the possibilities of our fishery resources is dependent upon adequate knowledge. Proper use of available manpower to obtain that knowledge is limited by the extent of the adequately trained and experienced personnel available for organizing and carrying out the best plans.

2. It is recommended that support be given to suitable plans for fishery biological surveys and fishery experimental management for utilizing experienced personnel in the transition period after the war.

Two different plans are presented below as examples of procedure that might be adopted; the inland problem being dealt with in towns of Ontario as an example, and deep sea fisheries in terms of the Maritime Provinces.

Areal Fishery Survey in Ontario

(a) Ontario would be divided into six areas.

(b) Each area is to be surveyed by from 50 to 100 non-technical men under the direction of one senior experienced technical expert. Each of these senior technicians is to have under him from three to five junior technicians for the direct supervision of the non-technical men. These junior technicians should be graduates or senior students from a university.

(c) A central office is to be established for all the areas of the province, with from 15 to 25 non-technical men under one technical expert for the organization of the data from the field workers. It is most essential that the results of each year's work be organized and studied, and used in planning the next year's program.

(d) The survey of the first year should cover all fishing activities and should provide on creel census or fishing record cards precise data on the yield of fish in angling, under domestic licences, and also in commercial fishing of the smaller inland lakes. The men making the survey should be taught in advance the general principles of fish management and conservation as a background for appreciation of the significance of their work and as a basis for attempts in their contacts with the citizens to develop a sense of local responsibility for the fishery resources.

(e) After the first year, the personnel should be gradually classified and directed to the fields of activity for which they proved to be best fitted, to continue their education at college or university, to take up work outside the field of fisheries, to be assigned to special work as hatchery attendants or as wardens, or in public relations, or for a more detailed fisheries biological survey, age determinations of fish, etc. It would be expected that a certain proportion of the men would ultimately be permanently employed in fisheries administration or in fisheries investigation.

(f) It would be expected that after the first year plans would be developed for determining with more accuracy the results of fish cultural procedure and for bringing into operation and assessing the value of lake and stream closure and lake and stream improvement associated with restocking under different conditions.

(g) There should be a simultaneous development of the work of fishery research laboratories, such as those of universities, and some of the non-technical personnel should be assigned to assist in this work. Such development should be an integral part of the whole program and the non-technical men should be increasingly more useful for assisting with it, particularly for routine aspects of experiments to test the practical conclusions from the research.

Experimental River Management in the Maritimes

Fishes that migrate between river and sea offer an exceptionally favourable opportunity for easy capture and for thorough assessment of the stock, both of which are important for effective management.

(a) Rivers are to be selected which can be fully controlled through co-operation with other interests for accurate experiments to give the highest yield of fish. These should be as different as possible in character (e.g. in proportion of lake and spring water, in slope and in bottom material) and in relation to the sea (e.g. in shape of estuary), as well as in the concomitant nature of the migratory fish.

(b) Since fishes need a number of years to mature, experiments in management require rather long periods of time. Valuable short-term projects can consist of thorough surveys in relation to each river to give a needed background, and of initiation of the experiments.

(c) An effort should be made to assure through the proper organizations an accurate contour and shore survey of each of the selected river systems, and an accurate hydrographic survey of the related portion of the sea.

(d) An effort should be made to assure in co-operation with other interests (lumbering, farming, mining) that there will be suitable roads for reaching all parts of the river system.

(e) For each river system a suitable survey plan is to be made to be carried out in a period of from two to five years by inexperienced men of approved educational background, who will be trained and directed by suitably qualified experts. For each river there will be required a personnel of from 10 to 40, depending upon its size.

(f) The survey will consist of a fisheries biological survey of all parts of the river system and of the related portion of the sea and will include initiation of the trapping of the migrating fish and of continuous records of water and air temperatures and water levels, which will form an integral part of the experiments in high fish production.

(g) The personnel will be engaged in collecting data and material in the field from as early in the spring until as late in the fall as weather conditions permit. During the remainder of the year they will need to put the data in order and examine the material; at this time they should work in close relation to a fisheries research laboratory where they will be able to consult experts in various fields of knowledge and have their data critically considered.

(h) For each river, after a preliminary survey plans should be drawn up (i) for the construction of suitable dams for maintaining water levels, for controlling natural freshets and for producing artificial freshets; and (ii) for assuring a succession of deep pools (with cool water at the bottom if feasible) from tide water up as shelters for the fish. Construction of these dams and pools required for the migratory fishes would be a valuable short-term project.

B. Long-Term Policy

For making the best use of our fishery resources the following recommendations are made:

3. That a vigorous effort be made to discover the causes of fluctuations in the stock, which need to be predictable for satisfactory planning of fishing operations.

4. That investigations be made of commercial fishing methods and of new sources of fish with the object of increasing the yield per unit of effort and at the same time of making fishing profitable when and where the fish are relatively scarce. This should result in larger returns to the fishermen.

5. That such restrictions be placed upon seasons of fishing, character of equipment, quantities of fish taken, or numbers of fishermen, as may be shown by accurate assessment to give the most satisfactory remuneration for the fishing

effort, and that in the fishery resources of northern Canada, where fish growth is slow, regulations based upon the best scientific advice available be imposed for the purpose of taking care of the needs of the native population.

6. That, to assure the greatest possible return from our waters, the quantity of any particular species to be taken should be the maximum possible without affecting the reproduction of the stock.

7. That study be made to determine for each species at what age and in what season it has the greatest potential value, and also how it can then be most profitably caught.

8. That an effort be made to discover for each important fish resource what use under the existing conditions will be most valuable, *e.g.*, for sport, for consumption by man, for feeding farm stock or for fertilizer.

9. That investigations for improving the curing and handling of fish for market be intensified, so that our fishery resources may be more fully utilized with adequate remuneration to those engaged in the industry.

10. That a definite effort be made to realize the possibilities of a much larger domestic market for our fish by assisting the industry to provide at least in all large centres a steady supply of superlatively fresh fish.

11. That, since the domestic fish trade consists largely of fish shipped from the Atlantic and Pacific to the inland provinces, and since success depends upon the maintenance of proper conditions at all stages in such distribution, inspection of fish handled for sale in Canada should be the responsibility of the federal authority.

12. That the responsibility for investigating the general problems of all fisheries be vested in the Fisheries Research Board of Canada and that so far as may be feasible each province develop facilities for investigating its local problems.

13. That investigations be intensified in attempting to develop methods of increasing the numbers of the valuable fishes and other aquatic animals that offer the most promising results, but that there be no extension of the methods now in use nor general application of new methods unless or until there has been clear demonstration of their effectiveness for the purpose.

14. That efforts be made to determine how to plant most effectively the young of the lake and stream fishes that are now being artificially hatched with success.

15. That the possibilities of pond culture of fishes and other aquatic animals be explored for use in districts not well provided with natural waters.

That in this connection the feasibility of utilizing elvers for eel culture be determined, the elvers to be taken when entering Maritime streams and shipped to the interior of the country for stocking ponds as has been the custom in Europe.

16. That experiments be undertaken to explore the possibilities of the easiest method of tapping the immense potentialities of the sea as a feeding ground for fishes by trapping anadromous fishes on their return to streams after feeding and growing in the sea. These consist of various species of salmon, trout, smelt, gaspereaux or alewives, shad, and bass. They breed in fresh water and any surplus over the number of each kind found by experiment to be adequate for stocking the river system could well be taken by a trap at the river mouth unless more valuable for angling in the river.

17. That, in view of the economic and international interests involved, the marine mammals, including sea otter, fur and other seals, sea lions, whales and walrus, require continuing and more intensive investigation with a view to proper conservation.

18. That, since angling or sport fishing forms a most important local asset for attracting tourists, and since assured, though only moderate, success in angling may form an adequate basis for building up a regular tourist business requiring guides, roads and living accommodations, assistance be given to ensure that fish are available during the tourist season, where physical conditions are found to warrant it and where the local population is prepared to co-operate in assuring the requisite facilities.

WILD LIFE (Terrestrial)

The term "Wild Life" has come to be applied to all terrestrial life (exclusive of trees that come under "Forestry") that is not under domestication or only so in part, and including such forms as muskrats and ducks that are partly, but not fully, aquatic.

There are general aesthetic and economic reasons for maintaining adequate wild-life populations of this country as a cultural asset of benefit to the people of Canada. Terrestrial wild life forms an important source of local food for the people in districts remote from the main avenues of transportation and distribution. It also supports the fur industry and furnishes the game animals. There is economic value to Canada in the fact that this wild life as a whole affords an attraction to tourists. It should also be kept in mind that wild life forms an integral and essential part of the natural web of life.

A. *Short-Term Projects*

The following are recommended:—

1. That, if a province or a region should devise worthwhile projects in surveying the wild-life resources of particular districts and in carrying out experimental management of these resources, and if such projects be approved by the federal authorities, the personnel therefor should be furnished by the federal government.

2. That immediate employment be furnished by restoring the wild life in worn-out areas near large centres of population for use as playgrounds for the local population and for nearby urban populations, as well as for the production of timber.

3. That in all land-use surveys and plans and in all other projects involving natural resources, such as for flood control, reclamation of land, and areal management, wild life should receive attention by the personnel including at least one member with the special duty of seeing that wild life be effectively handled.

4. That there be an immediate post-war selection and intensive preparatory training of suitable personnel required as leaders in the various wild-life projects.

5. That for their value in connection with use of wild-life resources support be given to projects involving accurate land surveys, soil surveys for effective land use, and water conservation.

6. That for such areas as may be selected Wild-life Corps be organized to obtain, compile and analyze data on the most important forms of wild life. Each unit should consist of 100 men, under a technically trained person, and with selected individuals in charge of 20 to 30 men. All units for each region or province should be under a director and an assistant, with a central office with a staff of about 15 persons to handle the data.

7. That the Dominion Government undertake the responsibility for an effective publicity program regarding wild life.

8. That the Dominion Government engage professional photographers of wild life, to secure for publicity and instructional use motion picture and still

photographs of Canadian wild-life subjects. These should be made with the advice of competent professional government scientists and the material should be released only after review by these specialists.

9. That there should be employed in the National Parks Bureau an adequate number of park naturalists (preferably university graduates with special preparation in natural science) to be stationed suitably in the National Parks. Their duties should be to give visitors reliable and interesting information about the park fauna and flora and geology; to conduct parties for observation of wild life and to assist in preparing and caring for nature centres, local museums and nature trails in the parks.

10. That there be organized under the National Museum of Canada in co-operation with provincial museums and universities a wild-life exploration of thirty-seven different areas throughout Canada, all of which are now virtually unexplored, in order to provide well-balanced knowledge of our wild-life resources. For each area from three to five or more men, in so far as suitable persons are available, could be usefully employed for a period of two to five years to cover the most important sections and obtain fairly complete collections of the species of plants and of the more important kinds of animal life, both vertebrate and invertebrate. Most of the work would be confined to a lengthy summer season, but much work could be done in winter, particularly on the big-game and fur-bearing animals as well as on equally important smaller species, for which much fuller knowledge is needed than has yet been available. This work should be done only under expert direction and should include, not only the collection of material, but also the assembling of data and the preparation of reports on the country traversed.

11. That consideration be given to the establishment of a national zoological garden, an undertaking which will utilize labour and which will serve as a scientific centre for investigating certain phases of wild life as well as an educative medium for the public and a tourist attraction.

B. *Long-Term Policy*

The following are recommended:—

12. That, since 90 per cent of the area of Canada supports wild life and two-thirds of it will yield no other permanent crop, since practically no research on terrestrial wild life is now under way under either federal or provincial auspices, and since the problem of the periodic fluctuations in animal numbers is nowhere else in the world more obvious and more important than in Canada, a (Terrestrial) Wild-Life Research Board under the Minister of Mines and Resources, comparable to the Fisheries Research Board under the Minister of Fisheries, be created by Act of Parliament. Such a Board should have authority not only to carry on terrestrial wild-life investigations in all parts of Canada as may be found desirable from time to time, but also to establish a number of permanent wild-life research centres with permanent staffs and adequate accommodation and equipment.

13. That, in addition to the four now employed, the Dominion Government employ three Chief Federal Migratory Bird Officers, for district administration of the Migratory Birds Convention Act, so that the entire Dominion may be covered by districts of convenient size. The men employed should be graduates of universities with specialization in zoology.

14. That the Dominion Government employ highly trained ornithologists (university graduates, preferably with graduate degrees) in the following services: (a) Two in the Lands, Parks and Forests Branch, Department of Mines and Resources, to carry on research in practical problems related to Canadian wild bird resources; (b) one in the National Museum to carry on

ornithological research in distribution and taxonomy, with related work in preparation and dissemination of information; (c) for local ornithological research in co-operation with other biological investigators one in each of such regional research centres as may be established under the proposed Wild-life Research Board.

15. That there be employed in the National Parks Bureau, seventeen technically trained men, ten primarily trained in mammalogy, for wild-life management in all the National Parks and seven limnologists, of which six should be located in fish-producing parks as fisheries managers. One of the mammalogists should serve as regional wild-life manager for all the western parks.

16. That at least one ornithologist and two mammalogists be appointed by each province (the number will depend upon the importance of the wild life in the particular province), and that the Dominion Government make similar appointments for the Yukon and the Northwest Territories and, in addition to such specialists, set up suitable field forces (5 and 10 men respectively might be required) for administration of the wild life.

17. That since in relation to the extent and value of its plant and animal life, Canada has had very inadequate development of its museum service, steps should be taken immediately after the war to strengthen the National Museum by building up a staff of competent scientists and giving it an organization more likely to favour its development, as recommended by the Royal Society of Canada, published on pages 46 and 47 of its Proceedings for the year 1938. It should have at least five curators in its Division of Biology, namely for mammals, birds, fishes, invertebrates and plants, with a number of assistant and associate curators, to conduct and supervise field work, to study the material collected, and to furnish information and prepare memoranda and reports for publication. A number of technicians, taxidermists, preparators and museum assistants should be provided, some of which might be selected from those employed under the plan for short-term biological exploration.

18. That steps be taken to institute and develop an organized eiderdown industry throughout the breeding range of the Northern and Pacific eiders in the Canadian Arctic ("Producing Eider Down", published by the National Parks Bureau). This would increase the incomes of Eskimos or other collectors and of processors and merchants outside the Arctic.

19. That attention be called to the prospect of increasing the annual yield of fur animals by the adoption of the system of registered trap lines where there is not sufficient control otherwise to ensure a sustained yield, but that the importance be affirmed of having the results carefully followed in order to determine how effective this method may be in each case.

20. That arrangements be made to develop and publicize wild-life tourist attractions to include wild-life tours to regions of especial interest, such as the bird colonies of the Gulf of St. Lawrence, the sea lion herds of British Columbia and the alpine flowers of the Rockies.

21. That the associated wild life be taken into consideration in forest management. While on the whole those practices that are good forestry are good for wild life, forest lands should be managed according to the most productive combination of all uses. For example, extensive pure stands of coniferous trees are of very little value to game, but are of decided value to some fur-bearing mammals, and any proposal for the establishment of such a stand would involve balancing these considerations with those related to forestry. Since a land management program is apt to be limited to those uses for which adequate direction is provided, there should be an assurance of expert direction for development and use of the wild life.

22. That attention be called to the social and educational value of wild life. Realization of this value requires very definite strengthening of nature education in schools.

23. That, since much data on wild life is becoming available, a staff of persons especially qualified for such study and analysis be developed at the best research centre.

24. That, because of the importance of cariboo to Canada, measures should be taken to study the life histories and conservation of these mammals in the principal part of their range.

25. That consideration be given to the extension and development of the use of wild plants for food for man, for forage for animals, and for therapeutics.

5. TOURIST INDUSTRY

Recommendations in respect to the tourist industry for:—

A. The provision of immediate post-war employment;

B. The long-time development of a natural resource of great national importance.

(a) Development of Canada's facilities for recreation and attractions for tourist travel as a means of providing post-war employment, maintaining and improving the health and morale of the Canadian people, supporting Canada's foreign exchange situation, and developing an important natural resource on a long-time basis should not be regarded as a natural and inevitable result of nature's bounty, but should receive carefully planned and amply financed support from the Government.

(b) The resources upon which a tourist industry are based are, in the main, of a type which is not exhausted by use. Scenery and environment can be "sold" over and over again in perpetuity without any impairment of the original capital.

(c) There is no likelihood of the market for scenery and environment being over-supplied. Pleasure travel, inevitably interrupted by the war, may be expected to be one of the first peace-time industries to revive, and to attain a magnitude far exceeding all past experience.

(d) The danger of a serious slump in the demand for travel and tourist services, which must otherwise be anticipated with the cessation of war-time activities, can be to a large extent offset by development, as a matter of government policy, of vacation travel on a scale previously unknown in this country.

(e) The tourist industry not only develops resources which otherwise would lie dormant, but, insofar as it attracts visitors from other lands, provides a market for the products of Canadian farms, factories, and handicrafts which otherwise would not be available.

(f) The tourist industry has a tendency to distribute population throughout the country, including its most remote parts, whereas the tendency of most industrial developments is to concentrate population in great cities or other densely populated areas.

(g) Preservation of the health and morale of the Canadian people, to which recreation contributes, is vitally essential. Facts revealed by medical examination of recruits for war services indicate that Canada needs to take very serious counsel with herself as to what she is going to do about the national health. Recreation should be made available to all classes of Canadians without regard to their financial status.

(h) Development of a national outlook and elimination of local prejudices can be promoted by large-scale travel of Canadians back and forth in their own

country. Only thus can the magnitude and diversity of Canada be properly appreciated by her own people. Similarly, exchange of travel with other countries promotes international goodwill, upon which Canada may find it necessary to lean heavily in the years of reconstruction.

(i) In addition to furnishing means of self-support to a substantial number of Canadians, tourist travel can be used as one of the most important means of acquiring foreign exchange. Before the war, and even in the early period of hostilities when foreign exchange was of the most vital importance, the travel industry was one of the chief contributors. As the financial benefits accruing to the Dominion from the travel industry are accomplished without any export or other depletion of Canadian resources, and are capable of almost indefinite expansion, this industry warrants support after the war.

Recommendations

A. For the Provision of Immediate Post-war Employment

1. As a means of contributing to employment in connection with all transportation, hotel, catering, oil station and similar services, as well as the employment of guides and outfitters and of agricultural, industrial, and handicraft production of all commodities consumed or acquired by tourists, there should be inaugurated as soon as possible after the cessation of hostilities an extensive publicity campaign under the Canadian Travel Bureau to promote travel in Canada, and adequate funds should be provided for this purpose.

2. Inasmuch as the National Parks of Canada are administered by the Federal Government and no question of title or jurisdiction is involved their importance should be recognized, in all federal activities designed to promote travel and tourism, and the National Parks Bureau should be provided with ample appropriations to enable it to carry out its policies efficiently and aggressively. This will involve extension and improvement of present national parks facilities, enlargement of certain parks, and the establishment of new parks in suitable areas.

3. To obtain the most rapid and effective development of the tourist industry after the war the Government should seek information and advice from those who have had long practical experience along that line. It is important that there should be an organized medium through which this experience can be expressed. Such a medium, already organized, is provided by the Canadian Association of Tourist and Publicity Bureaus. The Government should therefore encourage this Association (not necessarily by financial support) to the end that it may be truly expressive of the best judgment of all interests connected with the tourist industry.

4. Study should be made of the problem of facilitating vacation travel for those in low-income brackets, by excursion rates for transportation, provision of low-price accommodation such as hostels in the national and provincial parks, or by such other means as may be found practicable.

5. It is urged that all tourist bodies, public and private, be enlisted to encourage travel in Canada by Canadians and by visitors from other lands, and that efforts in this direction be co-ordinated by the Canadian Travel Bureau.

B. Long-Term Policy

6. The principles upon which a permanent government policy should be developed are the following:—

- (a) That tourism contributes substantially to the national income.
- (b) That this industry in Canada can be developed to large proportions if adequately encouraged.

- (c) That the health and morale of the Canadian people will be improved by better access to recreation facilities.
- (d) That the industry tends to promote general prosperity in Canada without competition with any other Canadian industry, without depletion of natural resources, and with a minimum of expenditures in proportion to returns.

7. Aside from the generalizations in the previous paragraph, the following specific long-term undertakings are suggested:

- (a) Construction and improvement of highways most suitable for tourist traffic throughout the Dominion.
- (b) Establishment of hostels and service facilities along such highways.
- (c) Extension of the national parks system by establishment of new parks and enlargement of certain existing parks.

MEMORANDA AND REPORTS

A broad review of the work of this Subcommittee is perhaps most simply provided by a reference to the reports and memoranda on the several aspects of the subject which it has brought together, through conferences, consultations, submissions from its members, and the results of its own deliberations.

I. *Conservation Policy: Integrated Programs*

1. Revised section of the Basic Memorandum on Conservation and Development of Natural Resources.
2. *Plan of restoration of natural resources as a post-war reconstruction measure* (E. Newton-White, July, 1941).
3. *Regional councils*. Notes on proposals sent to Committee on Reconstruction (Lewis V. Smith).
4. *New industries for the new South*. A discussion of the Tennessee Valley Authority program of technical research in industrial processing. Mobile, Alabama, March 20, 1941 (Reproduced from existing releases).
5. *The development of a region's resources*. Little Rock, Arkansas, October 17, 1941 (Tennessee Valley Authority. Reproduced from existing releases).
6. House of Commons: Special Committee on Reconstruction and Re-establishment. Minutes of Proceedings and Evidence. No. 9, Thursday, July 2, 1942. No. 10, Thursday, July, 1942 (Witness: Dr. R. C. Wallace).
7. *The Tennessee Valley Authority* (Dr. R. C. Wallace).
8. *Regional resources development* (Alvin H. Hansen and Harvey S. Perloff, National Planning Association pamphlet No. 16, October, 1942).
9. *Statement on organization and policy* (Dr. R. C. Wallace).
10. Minutes of Proceedings of Special Joint Meeting at Ottawa, December 4, 1942 (Committee on Reconstruction).
11. *Recommendation on organization* (January 23, 1943).
12. First report (final) of the Subcommittee (February 26, 1943).
13. Second report (final) of the Subcommittee (February 27, 1943).
14. House of Commons: Special Committee on Reconstruction and Re-establishment. Minutes of Proceedings and Evidence. No. 5, Friday, March 26, 1943 (Witness: Dr. R. C. Wallace).

Special Studies

1. *Conservation and rational utilization of natural resources in the Province of Quebec* (Professor Esdras Minville).
2. *Conservation and post-war rehabilitation*. A report prepared by the Guelph Conference on the conservation of the natural resources of Ontario (February, 1942).
3. A report of the Canadian Conservation Association and the second Annual Meeting in Montreal, April 13 and 14, 1942 (John D. Detwiler).
4. *Cumberland County: a survey of its resources and their utilization* (outline) (Nova Scotia Economic Council).
5. Report on King Township (Canadian Conservation Association).
6. *Proposed demonstration survey of Ganaraska Watershed, Durham County, Ontario* (Ontario Committee on Conservation and Rehabilitation, May 9, 1942).
7. *Proposed survey of Ganaraska Watershed, Durham County, Ontario*, as recommended by the Committee on Reconstruction (June 29, 1942).
8. Outline of report on the Ganaraska Watershed.

II. Forest Resources Programs

1. *Forestry and reconstruction* (D. Roy Cameron, September, 1940).
2. *The forestry phase* (D. Roy Cameron, March 6, 1942).
3. Report of subcommittee of the Board of Directors on the course to be followed by the Canadian Forestry Association relative to post-war rehabilitation.
4. *Statement on forest resources* (Canada. Department of Mines and Resources).
5. Minutes of the third meeting of the Subcommittee (April 11, 1942). Special conference on forestry problems.
6. *Draft statement of forest policy, 1942* (Canadian Society of Forest Engineers).
7. Excerpts from letter from Lyle F. Watts, Chief, U.S. Forest Service, to D. Roy Cameron, Dominion Forester, re. *Forest communities*. (Washington, January 30, 1943).
8. *Forest wealth* (Quebec Order in Council No. 3525).

III. Mineral Resources Programs

1. *Special considerations in conservation and wise exploitation in relation to the mining industry* (Dr. J. J. O'Neill).
2. *Canadian mining: a brief sketch with main reference to question of reserves* (Canada. Department of Mines and Resources).
3. Minutes of the fifth meeting of the Subcommittee (June 13, 1942). Special conference on mining problems.
4. *Problems in the mineral industry of Nova Scotia* (Dr. Alan E. Cameron).
5. *The mining industry of British Columbia and post-war conditions* (T. W. Bingay).
6. *Nova Scotia coal mining* (Dr. F. W. Gray).
7. *Mineral resources as affecting reconstruction in Saskatchewan* (Saskatchewan, Department of Natural Resources).
8. Memo regarding the report by a committee of the Canadian Institute of Mining and Metallurgy in 1939 (E. J. Carlyle).
9. *Canadian mining* (Dr. J. J. O'Neill, December, 1942).

IV. *Water and Power Resources**

1. Spot maps (Dominion Water and Power Bureau).
2. *Statement on water power* (Canada, Department of Mines and Resources).
3. Extracts from report of Committee on Western Water Problems—St. Mary and Milk Rivers, Alberta (Engineering Institute of Canada).
4. *Recommendations on the conservation of natural resources* (Canadian Society of Technical Agriculturalists, March 5, 1942).
5. Conference on post-war electric power problems: Western Canada (October, 1942).
6. *Telephone carrier equipment on rural electric lines* (J. B. Challies).
7. *A farm electrification program* (Manitoba Electrification Enquiry Commission).
8. *Rural Electrification* (with reference to Shawinigan Territory) (Huet Massue).
9. *Hydro-Electric progress in Canada during 1942* (Dominion Water and Power Bureau).
10. *Heating of Dwellings* (Huet Massue).
11. *Notes re P.F.R.A.* (E. S. Archibald, March 31, 1943).
12. Conference on post-war problems of natural resource development: Maritime Provinces (Sackville, N.B., June 19-21, 1943).

V. *Wild Life; Animal Resources*

1. *Memorandum on animal resources: a personal estimate* (Dr. A. G. Huntsman).
2. *Canada's wild life resources in relation to post-war reconstruction* (Canada. Department of Mines and Resources).
3. *Memorandum on Canada's commercial fisheries* (Canada. Department of Fisheries).
4. *Wild life* (Dr. A. G. Huntsman, December 4, 1942).

VI. *Parks, Tourist Resources*

1. *National parks and post-war reconstruction* (Canada, Department of Mines and Resources).

*Including certain aspects of agriculture.

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